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BULLETIN
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[No. 7.]

The Fresh-water Algæ of Maine. II.*

BY F. L. HARVEY.

Observations were continued the past season upon the Fresh-water Algæ of Maine, and below are given the species identified during the summer and fall of 1888, which were not mentioned in the BULLETIN for June of that year.

The species recorded for 1887 were from gatherings near Orono, but the past season we have had material from Augusta and Moosehead Lake, collected by Dr. A. G. Young of the State Board of Health, and from Guagus Stream, forty miles north east from Orono, collected by the writer, besides some rich gatherings from near home.

Quite a number of genera not found last year were discovered, but the interesting find of the season is a new species of *Nodularia* in fresh water.

We notice in the BULLETIN, Dec., 1888, p. 224, that Wm. West has published in Jour. Bot. xxvi. 339-340, a list of Maine Algæ found in a gathering sent him from Orono, Me., by my associate, Prof. Aubert. We have not seen this contribution, but having examined a part of the gathering made by Mr. L. H. Merrill which was sent abroad, and as our notes were made months before Mr. West's article appeared, we publish independently, feeling sure that in such an uncertain quantity as microscopic material some different species must have been observed.

The locality from which Mr. West's material came was ex-

*Continued from Vol. XV, p. 161 (June, 1888)

ceedingly rich in desmids and was a swampy place in a pasture, a part of the outlet of a Tamarack swamp flooded in the spring but dry in the late summer and fall. We have designated the locality as "Swamp east of the College Woods," and from it we examined material taken in June and August. References to plates and pages are to Wolle's "Fresh-water Algæ and Desmids of the U. S." In arranging the species we have followed the above work. Again we are greatly obliged to Mr. Wolle for advice and assistance.

CLASS I.—RHODOPHYCEÆ.

Family III.—Batrachospermaceæ.

69. *Batrachospermum vagum*, Ag. p. 57, Pl. LXV.—This species is widely distributed in Maine. Collected in Guagus Stream 40 miles northeast from Orono, also received from Dr. Young from near Augusta. Our specimens were typical, bluish-green but communicated a violet color to the water in which they stood.

CLASS II.—CHLOROPHYCEÆ.

Family VI.—Edogoniaceæ.

70. *Edogonium cryptoporum*, Wittr., p. 70, Pl. LXXIV.—Small form, scarce. In a gathering from Pushaw Stream. July.

71. *Æ. Borisianum* (LeCl.), Wittr., p. 81, Pl. LXXVIII.—Finely in fruit. Pool by the roadside east of Oldtown on the road to Sunk Haze Stream. Aug.

72. *Æ. Landsboroughi* (Hass.), Wittr. p. 91, Pl. LXXXI.—We sent Mr. Wolle some of the gathering and he made the following remarks regarding this species: "A beautiful specimen. The typical plant. Better than the one figured by me. Male plant frequent with 5 to 25 cells. The spores more ellipsoid than obovate yet characteristic. Very good."

Associated with the above species and with *Spirogyra calospora* and *S. bellis*, all finely in fruit. Aug.

Family VIII.—Confervaceæ.

73. *Conferva bombycina*, Ag., p. 142, Pl. CXXI.—Pushaw Stream. Aug. Common.

74. *Rhizoclonium fontinali*, Kg., p. 144, Pl. CXXI.—In one specimen the small processes were very scarce, and the plant grew in the still, deep water of Pushaw Stream. Aug.

75. *R. fluitans*, Kg. p. 145, Pl. CXXI.—In swift water at the outlet of a mill-flume. Attached to the rocks and sometimes the filaments were over a foot long. Orono. Aug.

Family X.—Vaucheriaceæ.

76. *Vaucheria Dillwynii*, Ag. p. 150, Pl. CXXVI.—This form was found in pools on the bank of the Penobscot, but being sterile could not be positively determined. Orono. Aug.

77. *V. sessilis* (Vauch.), DC., p. 151, Pl. CXXVII.—Pushaw Stream. Aug. Well in fruit. In still water.

Family XIII.—Protococcaceæ.

78. *Pediastrum Boryanum* (Turpin), Menegh. Desmids U. S. p. 153, Pl. LIII. Bond Brook, Augusta. Dr. Young. Cœnobiums in our specimens 16 to 32-celled.

79. *P. pertusum*, Kg. p. 154, Pl. LIII.—The type form from Augusta (Dr. Young) July. Also another form with lobes a little shorter than Wolle's Fig. 34. A careful count of the cells of one specimen gave 15, or the plan of five instead of four. Pool back of college woods. Aug.

80. *P. pertusum*, var. *brachylobum*, A. Br. p. 154, Pl. LIII.—Associated with the above in pool back of college woods, Orono. Aug.

81. *P. Ehrenbergii* (Corda), A. Br. p. 154, Pl. LIII.—Pool back of college woods. Aug. Diameter of our specimens 10μ 4 celled.

82. *Scenedesmus caudatus*, var. *typicus*, Kirch. p. 172, Pl. CLVI.—Bond Brook near Augusta (Dr. Young) Aug.

83. *S. caudatus*, var. *abundans*, Kirch. p. 172, Pl. CLVI.—Associated with the above.

84. *S. dimorphus*, Kg. p. 173. Pl. CLVI.—Associated with above.

85. *Polyedrum enorme* (Ralfs), Rab. p. 184, Pl. CLIX.—Small forms 12 to 25 μ . Associated with *Staurospermum viride*, Guagus Stream. July.

Family XIV.—Palmellaceæ.

86. *Dictyosphaerium Ehrenbergianum*, Naeg. p. 186, Pl. CLVI.—Several families observed had single cells at the ends of

the filaments, while others had the cells arranged in groups of four. Intermediate forms showing constrictions in the single cells were noticed, indicating process of division. Quite common in a gathering from Bond Brook, Augusta. Dr. Young.

87. *Tetraspora lubrica*, var. *lacunosa*, Chaud. p. 191, Pl. CLXV.—Sunk Haze Stream ten miles east of Oldtown. Attached to logs and stones in running water. Thallus sometimes nearly a foot long and light-green. July and Aug. Common.

88. *Porphyridium cruentum*, Næg. p. 194, Pl. CLXVI.—On brick floor in the cellar of Coburn Hall, State College, Orono. Oct.

89. *Rhaphidium polymorphum*, var. *falcatum* (Corda), Rab. p. 198, Pl. CLX.—Augusta, July. (Dr. Young.)

90. *R. convolutum* (Corda), Rab. p. 198, Pl. CLX.—Our specimens occurred in spherical masses composed of 50 cells or more. Bond Brook, Augusta. Dr. Young.

Family XVI.—Conjugatæ.

91. *Spirogyra calospora*, Cleve, p. 209, Pl. CXXXIII.—Pool by roadside east of Oldtown toward Sunk Haze Stream. Associated with the following and species of *Edogonium* mentioned above. Well fruited but not abundant. Aug.

92. *S. bellis* (Hass.), Cleve, p. 217, Pl. CXXXVII.—Associated with above. Abundant and finely fruited. *Pandorina morum* and several desmids occurred in the same pool, dug to get water for horses.

93. *Pleurocarpus mirabilis*, A. Br., p. 232, Pl. CXLIX.—The sterile form of this species is common, but its occurrence in fruit is rare. The finding of a large mass of it finely in fruit is interesting. Mr. Wolle knew the form eight years before fruit was observed and had not seen fruit-specimens since 1883, until we sent them last summer. Mouth of a spring brook, tributary of Guagus Stream, 40 miles northeast from Orono. July. The plant grew in the still stream where the cold spring water emptied. There was a mass of it, nearly ten feet each way.

94. *Staurospermum viride*, Kg. p. 234, Pl. CL.—Guagus Stream. July. Abundant.

Family XVII.—Desmidiæ.

95. *Bambusina Brebissonii*, Kg., p. 24, Pl. I.—Swamp by roadside west of Orono toward Pushaw Pond. Aug. Abundant.
- Desmidium Swartzii*, Ag. p. 26, Pl. II.—Mentioned before (No. 17) from sterile forms only. Found this season finely in fruit, as shown on Pl. II, fig. 3. Associated with the above. Aug. Abundant.
96. *Sphærozozma filiforme*, Rab., p. 29, Pl. IV.—Swamp back of college woods. Aug. Our plant differed in minor points from the description but not enough to separate it. In chains of cells 2 to 8. 15 to 20 μ diameter.
97. *S. vertebratum* (Breb.), Ralfs, p. 30, Pl. IV.—Associated with the above. Aug.
98. *Spirotænia condensata*, Breb., p. 33, Pl. III.—Swamp back of college woods. July and Aug.
99. *Penium margaritaceum*, Breb., p. 34, Pl. V.—Swamp back of college woods. Aug.
100. *Closterium Juncidum*, Ralfs., p. 38, Pl. VI.—Swamp back of college woods. Aug.
101. *C. macilentum*, Breb., p. 38, Pl. VI.—Pool by roadside east of Oldtown. Aug. Our plants measured $375 \times 10 \mu$ and were transversely one-striate.
102. *C. acerosum* (Schrank), Ehrb., p. 41, Pl. VI.—Swamp back of college woods. Aug. $60 \times 600 \mu$.
103. *C. strigosum*, Ehrb., p. 42, Pl. VI.—With the above. Aug.
104. *C. Dianæ*, Ehrb., p. 44, Pl. VII.—With the above. Aug.
105. *C. parvulum*, Næg., p. 45, Pls. VII and VIII.—With the above. Aug.
106. *Docidium crenulatum* (Ehrb.), Rab. p. 47, Pl. IX.—Augusta. July. Dip by Dr. Young. $48 \times 544 \mu$.
107. *D. truncatum*, Breb., p. 48, Pl. IX.—Swamp back of college woods. Aug.
108. *D. nodosum*, Bail., p. 50, Pl. XI.—With the above. Aug.
109. *Calocylindrus connatus*, var. *minus*, Nord., p. 55, Pl. XII. Spring brook in Orono. Aug. Common.

110. *Cosmarium ovale*, Ralfs., p. 57, Pl. XIII.—Swamp back of college woods. Aug. Very abundant. $116 \times 203 \mu$, some longer than recorded.

111. *C. tinctum*, Ralfs, p. 61, Pl. XVI.—With above. $10 \times 18 \mu$. Common. Aug.

112. *C. nitidulum*, De Not., p. 62, Pl. XVIII.—Moosehead Lake. July. Gathering by Dr. Young.

113. *C. læve*, Rab., p. 62, Pl. XV.—Form and size of this species but the cytoplasm differently arranged. $15 \times 12 \mu$. Moosehead Lake. Dr. Young. July.

114. *C. undulatum*, var. *crenulatum*, Wolle, p. 67, Pl. XVI.—Guagus Stream. July. Augusta. Dr. Young.

115. *C. triplicatum*, Wolle, p. 73, Pl. XIX.—Swamp back of college woods. Our form is not typical, but too near to separate.

116. *C. conspersum*, Ralfs, p. 75, Pl. XIV.—Spring brook, Orono. Our specimens are exactly like Wolle's fig. in form, but only 32μ diam. Further study may prove it to be a new species.

117. *C. Portianum*, Archer, p. 77, Pl. XIV.—Swamp back of college woods. Aug.

118. *C. ornatum*, Ralfs, p. 82, Pls. XVIII and XLIX.—With the above. Also from Moosehead Lake. Dr. Young. Diameter 32μ .

119. *C. subcrenatum*, Hantzsch., p. 84, Pl. XVIII.—Swamp back of college woods. July.

120. *C. biretum*, Breb., p. 86, Pl. XVII.—Pool by road toward Pushaw Pond. June. Small form, only 37μ diam.

C. Broomii, Thwaites, p. 86, Pl. XVII.—Recorded before (No. 40), but the forms observed this season were small, only $20 \times 27 \mu$, with the sinus more open and the neck longer than Wolle's fig. Frog pond, Orono. July.

121. *C. pseudopectinoides*, Wolle, p. 89, Pl. XIX.—Form of this species but only 23μ diameter. Moosehead Lake. Dr. Young. July.

122. *Xanthidium cristatum*, var. *TRUNCATUM*, n. var. Half cells nearly hemispherical, broadest at the ends. Ends truncate and bearing the four pairs of spines. Sinus more open. Differs from Delponte's variety of *X. cristatum* figured in "Desmidiacearum Subalpinarum" by being broadest at the ends and

truncate. Associated with the type form but less common. Swamp back of college woods. July.

123. *X. asteptum*, Nord., p. 93, Pl. XXI.—Form somewhat broader than Wolle's figure but shape and arrangement of spines the same. Swamp back of college woods. Aug.

124. *X. fasciculatum*, var. *subalpinum*, Wolle, F. W. A., p. 34, Pl. LVI.—With the above. Aug.

125. *X. antilopæum*, var. *polymazum*, Nord. p. 94, Pl. XXIII. With the above. July.

126. *Arthodesmus subulatus*, Kg. p. 96, Pl. XXIV.—Swamp back of college woods. July.

127. *A. incus*, var. *depressa*, Wolle, p. 97, Pl. XXIV.—Frog pond, Orono. July. Form only 9 μ diameter.

128. *A. octicornis*, Ehrb., p. 97, Pl. XXIV.—Bond Brook, Augusta. Collected by Dr. Young. July.

129. *Euastrum oblongum* (Grev.), Ralfs, p. 98, Pl. XXV.—Pool by roadside west of Orono. June. Also swamp back of college woods. Aug.

130. *E. pinnatum*, Ralfs, p. 98, Pl. XXVIII.—Swamp back of college woods. Aug.

131. *E. humerosum*, Ralfs, p. 99, Pl. XXXIII.—Pool by roadside west of Orono. June.

132. *E. ansatum* (Ehrb.), Ralfs, p. 99, Pl. XXIX.—Swamp back of college woods. Aug.

133. *E. didelta* (Turp.), Ralfs, p. 99, Pl. XXIX.—Moosehead Lake in gathering by Dr. Young. July.

134. *E. urnaforme*, Wolle, p. 100, Pl. LII.—Moosehead Lake (Dr. Young).

135. *E. rostratum*, Ralfs, p. 106, Pl. XXVII.—Roadside pool west of Orono. June.

136. *Micrasterias truncata* (Corda), Ralfs, p. 114, Pl. XXXVIII.—Swamp back of college woods and pool west of Orono. Our specimens were 100 μ diameter and had the ends well rounded. Common. Aug.

137. *M. Jenneri*, Ralfs, p. 115, Pl. XXXIII.—With the above. Aug.

138. *M. pinnatifida* (Kg.), Ralfs, p. 116, Pl. XXXVIII.—Spring west of college (L. H. Merrill). May.

139. *Stauroastrum muticum*, Breb. p. 119, Pl. XXXIX.—Swamp back of college woods. Aug.
140. *St. dejectum*, Breb. p. 121, Pl. XI.—With above. Aug. Also roadside pool west of Orono. June.
141. *St. dejectum*, var. *mucronatum*, Ralfs. Moosehead Lake. Gathering by Dr. Young. Specimens 48 μ diameter. July.
142. *St. Dickiei*, Ralfs, p. 122, Pl. XL.—Swamp back of college woods. Aug.
143. *St. margaritaceum*, Ehrb., p. 125, Pl. XLI.—Moosehead Lake. July. (Dr. Young).
- St. polymorphum*, Breb., p. 126, Pl. XLII.—Reported before, (No. 53) but specimens found this season were *pentagonal* in end view and the diameter 48 μ .
144. *St. regulosum*, Breb., p. 127, Pl. XLI.—Swamp back of college woods. Oct.
145. *St. alternans*, Breb., p. 128, Pl. XLI.—Associated with *Staurospermum viride*. Guagus Stream. July.
146. *St. gracile*, Ralfs, p. 133, Pl. XLIII. Swamp back of college woods. Aug.
147. *St. aculeatum*, Ehrb., p. 140, Pl. XLV.—With above. Aug.
148. *St. echinatum*, Breb., p. 141, Pl. XLV.—With above. Also roadside pool west of Orono. Aug. and June.
149. *St. spongiosum*, var. *Americanum*, Turner, Some New and Rare Desmids, Jour. R. M. S., Ser. II, Vol. V. Swamp back of college woods. Aug.

CLASS III.—CYANOPHYCEÆ.

Family XVIII.—Nostocaceæ.

150. *NODULARIA MAINENSIS*, n. spec. Trichomes long, 33 to 38 μ wide, æruginous; articulations short, 2 to 6 or more, frequently 4 to 6 in diameter; sheath distinct but close; heterocysts compressed, oval, orange, yellow or brownish-yellow, more or less at regular intervals. Found intermingled with *Vaucheria sessilis*, in Pushaw Stream, a tributary of the Penobscot, near Orono, Maine. July, 1888. Collected by F. L. Harvey. Mr. Wille has examined specimens and regards it as new.